REMARKS

Claims 1-16 are now pending in the application. Applicants thank the Examiner for courtesy extended during the phone conference on October 23, 2002. The Examiner agreed that the claims set forth in the prior Amendment are not anticipated by or obvious in view of Murty 4,544,868. The Examiner requested that Applicants file an Amendment After Final summarizing the discussion. The Examiner is respectfully requested to reconsider and withdraw the rejection(s) in view of the remarks contained herein.

REJECTION UNDER 35 U.S.C. § 102

Applicant traverses the rejection of Claims 1-16 under 35 U.S.C. § 102(b) as being anticipated by Murty (U.S. Pat. No.4,544,868).

Regarding claims 1 and 12, Murty does not show teach or suggest a switching circuit or method that forces current sharing by turning off DC bus current to one phase after turning on DC bus current to a subsequent phase as required by claims 1 and 12.

The Examiner specifically identified FIG. 5B of Murty in support of the position that Murty teaches turning off DC bus current to one phase after turning on DC bus current to a subsequent phase. Paragraph 3 of the Final Office Action.

Applicants respectfully assert that FIG. 5B does not support the Examiner's position. FIG. 5B merely shows the phase current for a single phase i_a. FIG. 5B does not show the relative timing of phase currents. FIGs. 5A, 5B and 5C appear to illustrate the phase current i_a for a single phase for low (FIG. 5A), medium

(FIG. 5B), and high motor speeds (FIG. 5C). The pulse width modulation decreases with increasing motor speed. Column 6, lines 41-57 state:

> The relationship between motor speed and the stator winding current is graphically depicted in FIGS. 5A-5C, where FIG. 5A depicts relatively low motor speed (680 rpm), FIG. 5B depicts medium motor speed (975 rpm), and FIG. 5C depicts relatively high motor speed (1335 rpm). Each of the graphs depict a stator winding current i.sub.a as a function of time and thus relate directly to the idealized trace of i.sub.a depicted in FIG. 2. The discontinuity at the center of each energization polarity corresponds to an energization pattern change such as from AB to AC or from BA to CA. Significantly, FIG. 5 shows that the energization frequency and the off/on duty cycle of pulse-width-modulation decreases with increasing motor speed, yielding substantially optimum energization for the production of smooth motor torque.

As set forth in the preceding text of Murty, FIG. 5 provides additional detail concerning the relative phase current timing shown in FIG. 2. In FIG. 2 of Murty, the phase current for phase A is turned off at the same time that the phase current for phase B is turned on. Likewise, the phase current for phase B in Murty is turned off at the same time that the phase current for phase C is turned on. FIG. 2 of Murty is set forth below:

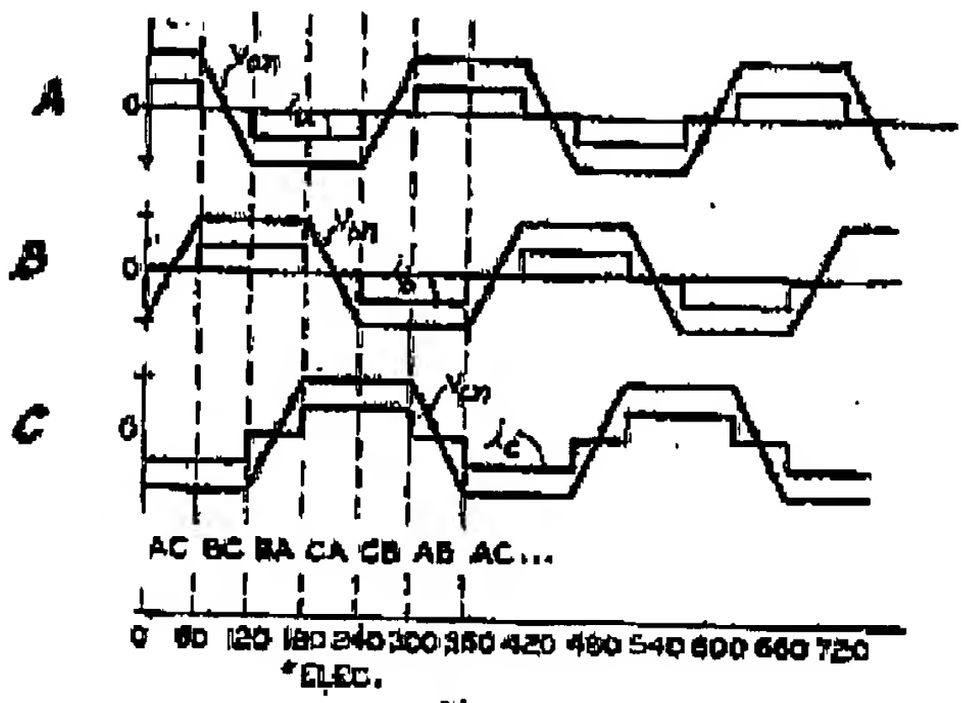

Fig.2

Claims 1 and 12 require the current for one phase to be turned off after the current for the next phase is turned on. Murty does not force sharing of DC bus current and therefore has square wave current waveforms that are similar to the conventional waveforms depicted in FIG. 5 of the present invention (for example, compare FIG. 5 of Murty with FIG. 5 in the present invention). The BLDC motor of Murty will probably have acoustic noise problems that are described in the Background of the Invention.

Based on the foregoing, Applicants respectfully assert that claims 1 and 12 are allowable. Claims 2-7 and claims 13-16 depend directly or indirectly from claims 1 and 12 and are allowable for the same reasons.

Regarding claim 9, Murty does not show, teach or suggest a control module for selectively enabling the transistors such that each phase of the motor has a phase turn on point that occurs before a phase turn off point of a preceding phase. Therefore, Murty also does not anticipate claim 9 for the reasons set forth above.

Claims 10 and 11 depend directly or indirectly from claim 9 and are allowable for the same reasons.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1211.

Respectfully submitted,

Dated: 10/25/02

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